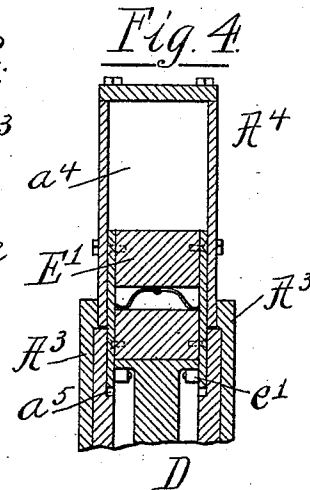
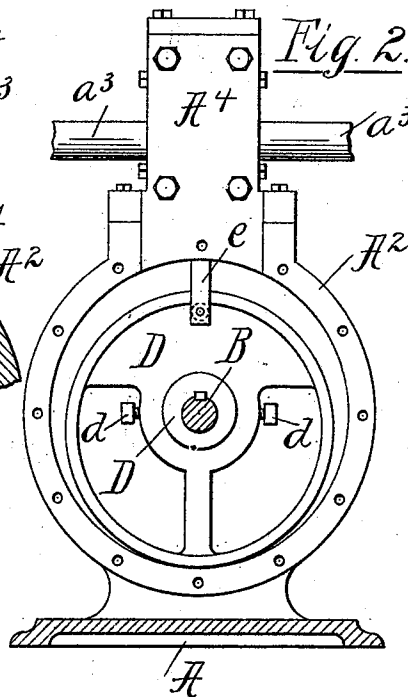
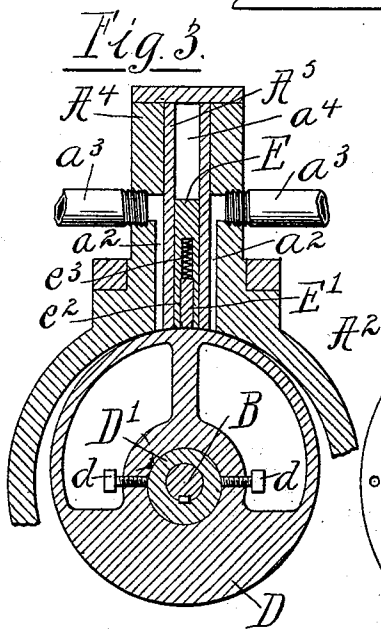
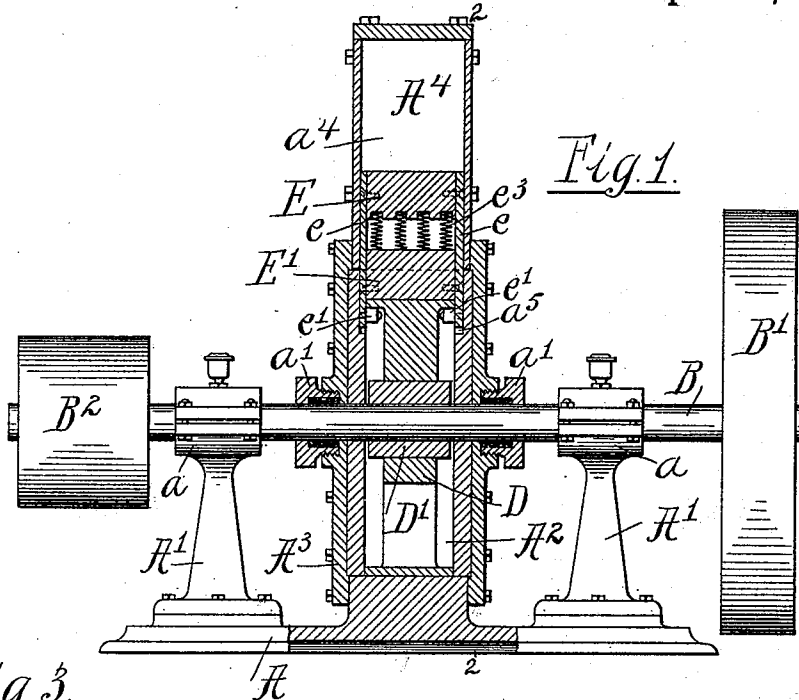


(No Model.)

W. SMITH.
ROTARY STEAM ENGINE.

No. 517,986.

Patented Apr. 10, 1894.



Witnesses
John W. Adams.
Fred J. Joslin

Inventor
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by Dayton, Todd & Brown
his Attorneys

UNITED STATES PATENT OFFICE.

WILLIAM SMITH, OF CLARINDA, IOWA, ASSIGNOR OF ONE-HALF TO ALONZO D. SMITH, OF CHICAGO, ILLINOIS.

ROTARY STEAM-ENGINE.

SPECIFICATION forming part of Letters Patent No. 517,986, dated April 10, 1894.

Application filed September 13, 1893. Serial No. 485,386. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM SMITH, of Clarinda, in the county of Page and State of Iowa, have invented certain new and useful Improvements in Rotary Steam-Engines; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to improvements in rotary engines, its object is to provide an improved construction in that class of machinery, and it consists in the matters hereinafter set forth and particularly pointed out in the appended claims.

In the accompanying drawings illustrative of a rotary engine constructed in accordance with my invention, the principal features are generally similar to those disclosed in my pending application, filed March 3, 1893, Serial No. 464,494.

Figure 1 is a longitudinal sectional elevation of a construction embodying my invention. Fig. 2 is a similar view on line 2—2 of Fig. 1. Fig. 3 is a transverse sectional detail of the piston and upper part of the cylinder and steam chest. Fig. 4 is a sectional detail of a construction somewhat modified from that otherwise shown.

A designates the base plate of the engine frame and A' A' supporting standards secured to the base plate at opposite ends thereof, and provided with bearings *a a* within which the driving shaft B of the engine is journaled. The usual balance wheel B' is shown mounted upon the shaft B and said shaft is also provided with a driving pulley B² or other suitable means of taking off the power.

A² designates the engine cylinder which is secured to the base plate A between the standards A', and is arranged concentric with the shaft B, the latter passing centrally through the cylinder and through suitable stuffing boxes *a'* in the cylinder heads A³. Within the cylinder A² a cylindrical piston head D of less diameter than the interior of the cylinder is secured to the shaft B sufficiently out of center to constantly engage with a portion of its perimeter the cylindric wall of the cylinder. The connection between the shaft

and the piston head is, in my present improvement, made such as to permit an adjustment of the eccentricity of said piston head in order that any wear between the perimeter of said head and the cylindric wall of the cylinder may be taken up, and perfect adjustment secured at the point of contact between them. Such adjustable connection comprises, in this instance, a small circular cam D' rigidly secured to the shaft B and adjustably secured within an eccentric circular aperture in the piston head D by means of set screws *d* which penetrate the hub of the piston head and engage the perimeter of the cam D'. Obviously with this construction the piston head may be moved toward or from the cylindric wall of the cylinder by loosening the set screws *d* and rotating it upon the cam D' to the desired extent. The set screws *d* being then tightened the piston will be rigidly and operatively attached to the shaft in its desired adjustment.

Secured to the upper portion of the cylinder A² and extending upwardly therefrom is the steam chest A⁴ through which suitable steam and exhaust ports *a*² lead from the interior of the cylinder to the usual steam and exhaust pipe *a*³. Between said ports *a*² and within a suitable aperture *a*⁴ in the steam chest is provided a vertically reciprocating plunger or steam abutment E the lower end of which is maintained in constant engagement with the perimeter of the piston head D by means of downward extending lateral arms *e* secured to the plunger carrying friction rollers *e'* which engage the inner surface of the rim of the piston D, which is undercut, as shown, for that purpose. Suitable radial apertures *a*⁵ in the cylinder heads A³ allow for the movement of the lateral arms *e* while permitting said heads to engage the piston rim so closely as to prevent leakage between said rim and heads.

As a means of maintaining a close and steam tight contact between the lower end of the plunger and the perimeter of the piston D regardless of the wear between the surfaces, said plunger is, in my improved construction, provided with an inner plate E' of equal width with the face of the piston D and fitted to slide within an elongated vertical re-

cess e^2 within the plunger. Means are provided for affording a yielding downward pressure upon the plate E' consisting, in this instance, of a plurality of coil springs e^3 inserted in the upper part of the recess e^2 and serving to constantly press the plate down upon the piston. Obviously any other form of spring, such, for example, as that shown in Fig. 4, may be used in place of the coil springs e^3 , and in some cases it may be desirable to use rubber or similar elastic material or other equivalent of a spring. The lower ends of the plunger E and plate E' may be beveled or rounded, as shown, to provide for the varying angle assumed by the face of the piston as it rotates. In this instance the division walls of the chest between the ports a^2 and the central aperture a^4 within which the plunger E reciprocates are formed by separate plates A^5 which serve as ways for said plunger and which may be readily replaced when worn. Obviously from the exactly symmetrical construction of the machine either of the ports a^2 may be used as a steam port while the other acts as an exhaust port, so that the engine is adapted to run perfectly well in either direction.

I claim as my invention—

1. A rotary engine comprising a steam cylinder provided with steam and exhaust ports, a smooth faced rotating piston mounted upon a shaft at the center of the cylinder, a reciprocating plunger located between the ports and constantly held against the periphery of the piston, said plunger being provided with an interior, bodily movable plate adapted to engage the face of the piston, and means for imparting to said plate a yielding pressure toward the piston, substantially as described.
2. A rotary engine comprising a steam cylinder provided with steam and exhaust ports, a smooth faced rotating piston adjustably mounted eccentrically upon a shaft at the center of the cylinder, a reciprocating plunger located between the ports, inwardly extending lateral arms secured to said plunger and provided with friction wheels engaging the inner surface of the piston rim, said plunger being provided with a reciprocating plate adapted to engage the face of the piston, and means

for imparting to said plate a yielding pressure toward the piston, substantially as described.

3. A rotary engine comprising a steam cylinder provided with steam and exhaust ports, a smooth faced rotating piston adjustably mounted eccentrically upon a shaft at the center of the cylinder, a reciprocating plunger located between the ports, inwardly extending lateral arms secured to said shaft and provided with friction wheels engaging the inner surface of the piston rim, an elongated recess at the inner end of said plunger, a movable plate within said recess adapted to engage the face of the piston, and a spring imparting to said plate a constant pressure toward the piston, substantially as described.

4. A rotary engine comprising a steam cylinder provided with steam and exhaust ports, a smooth faced rotating piston mounted eccentrically at the center of the cylinder, and a reciprocating plunger located between the said ports, and constantly held against the piston, the plunger being provided with an interior movable plate adapted to engage the face of the piston, and means for providing a yielding pressure on said plate toward the piston, substantially as described.

5. A rotary engine comprising a steam cylinder provided with steam and exhaust ports, a smooth faced rotating piston mounted eccentrically at the center of the cylinder, a reciprocating plunger located between the ports and constantly held against the piston, an elongated recess at the inner end of said plunger, a bodily movable plate within said recess adapted to engage the face of the cylinder, and a spring within said recess engaging said plate and imparting thereto a constant pressure toward the piston, substantially as described.

In testimony that I claim the foregoing as my invention I affix my signature in presence of witnesses.

WILLIAM SMITH.

Witnesses:

GEO. MÜLLER,
L. W. WARD,
TAYLOR E. BROWN.